CLAIMS

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1. An electrochemical cell, which comprises

as at least part of an anode, a lithium transition metal oxide or sulphide compound which has a $[B_2]X_4^{n-}$ spinel-type framework structure of an $A[B_2]X_4$ spinel wherein A and B are metal cations selected from Li, Ti, V, Mn, Fe and Co, X is oxygen (O) or sulphur (S), and n- refers to the overall charge of the structural unit $[B_2]X_4$ of the framework structure, and the transition metal cation of which in its fully discharged state has a mean oxidation state greater than +3 for Ti, +3 for V, +3,5 for Mn, +2 for Fe and +2 for Co;

as at least part of a cathode, a lithium metal oxide or sulphide compound; and

an electrically insulative lithium containing liquid or polymeric electronically conductive electrolyte between the anode and the cathode, such that, on discharging the cell, lithium ions are extracted from the spinel-type framework structure of the anode, with the oxidation state of the metal ions of the anode thereby increasing, while a concomitant insertion of lithium ions into the compound of the cathode takes place, with the oxidation state of the metal ions of the cathode decreasing correspondingly.

2. A cell according to Claim 1, wherein the compounds of the anode and the cathode are lithium metal oxide compounds.

3. A cell according to Claim 1 wherein, in the compound of the anode, B is a single transition metal cation type.

4. A cell according to Claim 1 wherein, in the compound of the anode, B is a mixture of different transition metal cations.

5. A cell according to Claim 1, wherein the compound of the anode is a stoichiometric spinel selected from the group comprising $Li_4Mn_5O_{12}$, which can be written as $(Li)_{8a}[Li_{0,33}Mn_{1,67}]_{16d}O_4$ in ideal spinel notation; $Li_4Ti_5O_{12}$, which can be written as $(Li)_{8a}[Li_{0,33}Ti_{1,67}]_{16d}O_4$ in ideal spinel notation; $LiTi_2O_4$ which can be written as $(Li)_{8a}[Ti_2]_{16d}O_4$ in ideal spinel notation; LiV_2O_4, which can be written as $(Li)_{8a}[V_2]_{16d}O_4$ in ideal spinel notation; and $LiFe_5O_8$, which can be written as $(Fe)_{8a}[Fe_{1,5}Li_{0,5}]_{16d}O_4$ in ideal spinel notation.

6. A cell according to Claim 1, wherein the compound of the anode is a defect spinel selected from the group comprising $Li_2Mn_4O_9$, which can be written as $(Li_{0,89}\square_{0,11})_{8a}[Mn_{1,78}\square_{0,22}]_{16d}O_4$ in spinel notation; and $Li_2Ti_3O_7$, which can be written as $(Li_{0,85}\square_{0,15})_{8a}[Ti_{1,71}Li_{0,29}]_{16d}O_4$ in spinel notation.

7. A cell according to Claim 1, wherein the compound of the anode is a lithium-iron-titanium oxide having a spinel-type structure and in which lithium and iron cations are located on the A-sites, and lithium, iron and titanium cations on the B-sites.

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8. A cell according to Claim 1 wherein, in the compound of the anode, the $[B_2]X_4$ framework structure contains, within the framework structure or within the interstitial spaces of the framework structure, additional metal cations to the lithium ions and the A and B cations to stabilize the structure, with the additional metal cations being present in an amount less than 10 atomic percent.

9. A cell according to Claim 1, wherein the lithium metal oxide compound of the cathode also has a spinel-type framework structure.

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10. A cell according to Claim 9, wherein the framework structure of the lithium metal oxide compound of the cathode has as its basic structural unit, a unit of the formula $[B_2]X_4^{n-}$, where $[B_2]X_4^{n-}$ is the structural unit of an $A[B_2]X_4$ spinel, with the X anions being arranged to form a negatively charged anion array, and wherein

A is a lithium cation;

B is a metal cation;

X is oxygen (O); and

n- refers to the overall charge of the structural unit $[B_2]X_4$ of the framework structure, with the transition metal cations of the anode being more electropositive than those of the cathode.

11. A cell according to Claim 10 wherein, in the compound of the cathode, B is a single metal cation type.

12. A cell according to Claim 10 wherein, in the compound of the cathode, B is a mixture of different metal cations.

13. A cell according to Claim 10, wherein the compound of the cathode is a spinel in which the B cation is selected from the group comprising Li, Mn, Co and Ni.

14. A cell according to Claim 10 wherein, in the compound of the cathode, the $[B_2]X_4$ framework structure contains, within the framework structure or within the interstitial spaces of the framework structure, additional metal cations to the lithium ions and the A and B cations to stabilize the structure, with the additional metal cations being present in an amount less than 10 atomic percent.

15. A cell according to claim 14, wherein the compound of the cathode is $Li_{1+\delta}Mn_{2-\delta}O_4$ where $0<\delta\leq 0,1$.

16. A cell according to Claim 14, wherein the compound of the cathode is $LiM_{\delta/2}Mn_{2-\delta}O_4$ where M=Mg or Zn and $0<\delta\leq 0,05$.

17. A cell according to Claim 1, wherein the lithium metal oxide compound of the cathode has a layered-type structure conforming to the formula $Li_xCo_{1-y}Ni_yO_2$ where $0<x\leq 1$ and $0\leq y\leq 1$.

18. A cell according to Claim 1, wherein the anode compound offers a relatively low voltage of 3V or less against pure

lithium, while the cathode compound offers a relatively high voltage of between 3V and 4,5V against pure lithium.

19. A cell according to Claim 1, wherein the electrolyte is a room temperature electrolyte selected from the group comprising $LiClO_4$, $LiBF_4$, and $LiPF_6$ dissolved in an organic salt selected from the group comprising propylene carbonate, ethylene carbonate, dimethyl carbonate, dimethoxyethane and appropriate mixtures thereof.

20. A cell according to Claim 1, wherein the electrolyte is a polymeric electrolyte selected from the group comprising polyethylene oxide (PEO) - $LiClO_4$, PEO - $LiSO_3CF_3$ and PEO - $LiN(CF_3SO_2)_2$.